

IN THE CLAIMS

Claim 1 (currently amended). A process for preparing a polyacrylate having an at least bimodal molecular weight distribution, characterized in that which comprises polymerizing a monomer mixture which comprises of

- a1) 70% to 100% by weight acrylic acid and/or acrylic esters of the formula $\text{CH}_2=\text{C}(\text{R}')(\text{COOR}^2)$, where $\text{R}' = \text{H}$ or CH_3 and R^2 is an alkyl chain having 1 to 20 carbon atoms, and
at 70%-100% by weight, based on the polymer,
- a2) 0 to 30% by weight olefinically unsaturated monomers containing functional groups,
at 0-30% by weight, based on the polymer,
is polymerized in an at least two-phase free-radical solvent
Polymerization in the presence of an organic solvent or in mixtures of organic solvents to give a polyacrylate having a broad, an at least bimodal molecular weight distribution,
The polymerization taking place being carried out in a first phase of the at least two-phase polymerization, by means of a low in the presence of a first initiator concentration relative to the monomer, to give a first polymer having a first molecular weight which is high on average, and, before the monomer mixture has been completely consumed by reaction the polymerization, a next further phase or phases of polymerization is or are started, by the addition at least once of a regulator, and in this further phase or further phases a further second polymer or polymers is or are synthesized, said second polymer having a second molecular weight which is relatively low on average which second molecular weight is lower than said first molecular weight.

Claim 2 (previously presented). The process of claim 1, wherein the at least two-phase free-radical polymerization is taken to a total conversion of all

phases of greater than 97%.

Claim 3 (previously presented). The process of claim 1 wherein the polymerization is carried out in two phases and a bimodal molecular weight distribution is built up, the molecular weight maxima in the molecular weight distributions of the two polymers being at least 50 000 g/mol apart.

Claim 4 (previously presented). The process of claim 1, wherein the polydispersity of the polymers is greater than 6.

Claim 5 (previously presented). The process of claim 1, wherein the molar ratio of initiator to monomer in the first phase monomer mixture-to initiator is less than 0.005.

Claim 6 (previously presented). The process of claim 1, wherein the addition of initiator takes place in two or more steps.

Claim 7 (previously presented). The process of claim 1, wherein said at least one regulator is selected from the group consisting of alcohols, ethers, dithioethers, dithiocarbonates, trithiocarbonates, nitroxides, alkyl bromides, thiols, TEMPO and TEMPO derivatives.

Claim 8 (previously presented). The process of claim 1, wherein the regulator is added no earlier than after one hour's polymerization time but no later than two hours before the end of polymerization.

Claim 9 (**currently amended**). A polyacrylate as obtained by the process of claim 1, comprising the following monomer units:

a1) 70% to 100% by weight acrylic acid and/or acrylic esters of the formula $\text{CH}_2=\text{C}(\text{R}')(\text{COOR}^2)$, where $\text{R}' = \text{H}$ or CH_3 and R^2 is a linear,

branched or cyclic alkyl chain having 1 to 20 carbon atoms,
at 70%-100% by weight, based on the polymer,
a2) **0 - 30% by weight** olefinically unsaturated **monomers monomer units** containing functional groups,
at 0-30% by weight, based on the polymer,
and having **a-broad, an** at least bimodal molecular weight distribution, the molecular weight maxima in the molecular weight distributions of at least two polymers being at least 50 000 g/mol apart.

Claim 10 (previously presented). The polyacrylate of claim 9, wherein the olefinically unsaturated monomers containing functional groups are selected from the group consisting of maleic anhydride, vinyl acetate, acrylamides, and double-bond-functionalized photoinitiators containing functional groups.

Claim 11 (previously presented). The polyacrylate of claim 9 further comprising crosslinkers, photoinitiators, resins, plasticizers, fillers, expandants, compounding agents and/or aging inhibitors.

Claim 12 (previously presented). A pressure-sensitive adhesive comprising the polyacrylate of claim 9.

Claim 13 (previously presented). An adhesive tape comprising the pressure-sensitive adhesive of claim 12 on one or both sides of a carrier film.